

Patent Claims

1. A mouth rinse with a spray nozzle and a nozzle outlet, which is constructed in such fashion that a liquid jet is produced, which involves feeding a cleaning liquid to the spray nozzle and conveying it to and discharging it from the nozzle outlet,
5 characterized by a construction such that the cleaning liquid is fed at high pressure to the spray nozzle and the nozzle outlet produces from the exiting cleaning liquid a liquid jet of high velocity comprised of micro-sized drops.
2. The mouth rinse as claimed in claim 1,
10 characterized in that the fluid pressure amounts to at least 15 bar and/or the velocity equals at least 23 m/s.
3. The mouth rinse as claimed in claim 1 or 2,
characterized in that the spray nozzle is constructed such that the liquid jet is a diverging hollow cone jet.
4. The mouth rinse as claimed in any one of the claims 1 to 3,
15 characterized by a construction such that the cleaning liquid is fed to the spray nozzle at a pressure of at least 15 bar, preferably between around 25 bar and 55 bar, in particular between 35 bar and 45 bar.
5. The mouth rinse as claimed in any one of the preceding claims,
20 characterized in that the spray nozzle is constructed such that the liquid jet in the nozzle outlet is a thin film which is transformed into micro-sized drops during or after exiting from the nozzle outlet.
6. The mouth rinse as claimed in any one of the preceding claims,
characterized in that the nozzle outlet, the spray nozzle and/or the mouth rinse
25 are constructed such that the drops have a diameter of around 5 μm to 10 μm and a velocity of at least 23 m/s, preferably around 40 m/s to 55 m/s.
7. The mouth rinse as claimed in any one of the preceding claims,
characterized by a pump adapted to be driven by an electric motor and a liquid container, in which the pump is connected to a hand piece and a spray nozzle by means of a tube, and the spray nozzle (1) is arranged on the hand piece (31).

8. The mouth rinse as claimed in claim 7,
characterized in that the spray nozzle (1) on the hand piece (31) is exchange-
able for another spray and/or jet nozzle.

9. The mouth rinse as claimed in any one of the claims 7 or 8,
5 characterized in that the pump (28) is switchable between several, in particular
between two, modes of operation in dependence upon the spray and/or jet nozzle (1)
arranged on the hand piece (31).

10. The mouth rinse as claimed in claim 9,
characterized in that a rotational speed or torque sensor (32) is arranged on the
10 pump (28) or on the electric motor (29) in order to detect the rotational speed or the torque of
a rotor of the pump (28) or the electric motor (29), that a signal indicative of the detected
rotational speed or the detected torque is deliverable from the rotational speed or torque
sensor (32) to a control unit, and the electric motor (29) is controllable by the control unit with
the operating mode assigned to the detected rotational speed or the detected torque.

15 11. The mouth rinse as claimed in claim 10,
characterized in that a pressure sensor (32) is arranged between the pump (28)
and the spray nozzle (1) for detecting the pressure of the cleaning liquid fed to the spray
nozzle (1), that a signal indicative of the detected pressure is deliverable from the pressure
sensor (32) to a control unit, and the electric motor (29) is controllable by the control unit with
20 the operating mode assigned to the detected pressure.

12. The mouth rinse as claimed in any one of the preceding claims,
characterized by a crank mechanism of a pump of the mouth rinse, with a drive
element adapted to be driven for rotation about an axis of rotation by a drive device, and with
an eccentric shaft or crankpin which acts as an output and is arranged on the drive element a
25 total eccentric dimension away from and parallel to the axis of rotation, said eccentric shaft or
crankpin (110) being arranged on the drive element (102) so as to be adjustable in their total
eccentric dimension (e3, e4).

13. The mouth rinse as claimed in claim 12,
characterized in that the drive element (102) is adapted to be driven for rotation
30 in reversible manner and the eccentric shaft is arranged on an output element which is
arranged on the drive element (102) such as to be freely pivotal between a first and a second

end position about a pivot axis arranged a first eccentricity (e1) away from and parallel to the axis of rotation.

14. The mouth rinse as claimed in claim 13,
c h a r a c t e r i z e d i n t h a t the output element has a disk (106) that is mounted on
5 the drive element (102) such as to be pivotal about the pivot axis, the disk (106) carries a
crankpin (110) that extends with a second eccentricity (e2) parallel to the axis of rotation, and
the drive element (102) has an axially projecting driver (113) that is pivotal with the drive
element (102) and projects between two stops (114, 115) defining the two end positions, said
stops (114, 115) being arranged on the disk (106).

10 15. The mouth rinse as claimed in claim 14,
c h a r a c t e r i z e d i n t h a t the second eccentricity (e2) of the crankpin (110) is
greater than the first eccentricity (e1) of the disk (106) and/or the first eccentricity (e1) of the
crankshaft (122) is smaller than the second eccentricity (e2) of the crankpin (110).

15 16. The mouth rinse as claimed in claim 14 or 15,
c h a r a c t e r i z e d i n t h a t the stops (114, 115) are, respectively, the ends of a
circular-arc-shaped, concentrically arranged groove (112) in the disk (106) in which the driver
(113) is movable, said groove (112) extending preferably over an angular range of up to
180°.

20 17. The mouth rinse as claimed in any one of the claims 12 to 16,
c h a r a c t e r i z e d i n t h a t the drive element (102), in particular the drive shaft, is
connected to a drive gear, preferably a spur gear (105).

25 18. The mouth rinse as claimed in any one of the preceding claims,
c h a r a c t e r i z e d b y a plunger pump, with a pump housing accommodating a pump
chamber into which a pump inlet and a pump outlet lead, with a piston (205) axially movably
guided in the pump chamber and being sealed against the wall of the pump chamber by
means of a seal, with an eccentric drive or crank mechanism for axially movably driving the
piston, said eccentric drive or crank mechanism being connected to the piston through a
crankpin extending in a direction transverse to the direction of movement of the piston, and
said piston (205) being axially slidably guided in two spaced bearings (212, 213) of the pump
30 housing (202).

19. The mouth rinse as claimed in claim 18,
characterized in that at least one of the bearings (212, 213) is arranged in an
end area of the displacement travel of the piston (205) in the pump housing (202).

20. The mouth rinse as claimed in any one of the claims 18 or 19,
5 characterized in that the crankpin (220) is mounted for rotation in a slider (208)
or a sliding block and said slider (208) or sliding block is movably arranged in a direction
transverse to the direction of movement of the piston (205) in a sliding-block guideway (207)
connected to the piston (205), said slider (208) or sliding block preferably having a cylindrical
cross section and said sliding-block guideway (207) being constructed as a bore (217) with a
10 corresponding cross section in a part preferably formed fast with the piston.

21. The mouth rinse as claimed in claim 20,
characterized in that an elongated hole (221) is constructed in the wall of the
sliding-block guideway (207) for the crankpin (220) to pass through, said elongated hole
having a greater width than the diameter of the crankpin (220), wherein preferably the crank-
15 pin (220) is mounted for rotation in the slider (208) in a bearing (219) which is inserted in a
bore (118) of the slider (208) and/or the piston (205) is arranged for rotation about its longitu-
dinal axis (H) and/or the slider (208) is arranged for rotation about its longitudinal axis (V).

22. A spray nozzle for creating a liquid jet for a mouth rinse according to any one
of the preceding claims, with a nozzle member that is provided with a chamber into which
20 extends a liquid duct supplying pressurized cleaning liquid and from which a nozzle outlet for
discharging a cleaning liquid jet extends,
characterized in that the chamber (6) is connected to a whirl chamber (15) of
approximately round cross section for creating a circulating flow of the cleaning liquid, the
nozzle outlet (18, 19) extending centrally from said whirl chamber and being comprised of a
25 preferably approximately cylindrical narrow passage and an optionally preferably adjacent, in
particular approximately conical, expansion, said nozzle outlet (18, 19) being formed pref-
erably in a nozzle attachment (3) arranged on the nozzle member (2).

23. The spray nozzle as claimed in claim 22,
characterized in that the expansion is a hollow cone or a conical surface (19).

24. The spray nozzle as claimed in claim 22 or 23,
c h a r a c t e r i z e d i n t h a t openings (14) lead into the whirl chamber (15) in an
approximately transverse direction and with a center offset (x) relative to the longitudinal axis
of the whirl chamber (15), such that the liquid jet exiting from the openings (14) impacts on
5 the opposite wall of the whirl chamber (15) at an angle not exceeding 45°.

25. The spray nozzle as claimed in any one of the claims 22 to 24,
c h a r a c t e r i z e d i n t h a t on a cylindrical outer side of a - preferably first - cup-
shaped part (8) axially extending grooves (12) lead from the chamber (6) to openings (14).

26. The spray nozzle as claimed in claim 25,
10 c h a r a c t e r i z e d i n t h a t the pressure piece (7) has at its other end a second cup-
shaped part (10) whose interior space is in communication with the liquid duct (5) as well as
with the chamber (6), wherein in particular an interior space of the second cup-shaped part
(10) communicates with the chamber (6) through at least one opening, preferably three to
four openings, each of which is constructed as an axial slit (11).

15 27. The spray nozzle as claimed in any one of the claims 22 to 26,
c h a r a c t e r i z e d i n t h a t a pressure piece (7) is axially resiliently secured in the
chamber (6) and comprised in particular of an elastic material, wherein the sections of the
second cup-shaped part (10) formed by the slits (11) preferably form spring arms (21).

28. A dental cleaning system comprised of a mouth rinse and/or a spray nozzle
20 according to any one of the preceding claims,
c h a r a c t e r i z e d b y two operating modes, including a high-pressure mode for the
removal of dental plaque and an oral rinse mode with reduced pressure.

29. A dental cleaning system, mouth rinse or spray nozzle according to any one of
the preceding claims,
25 c h a r a c t e r i z e d b y a brush attachment, preferably a ring-shaped brush, which is
connected or connectible to the spray nozzle.